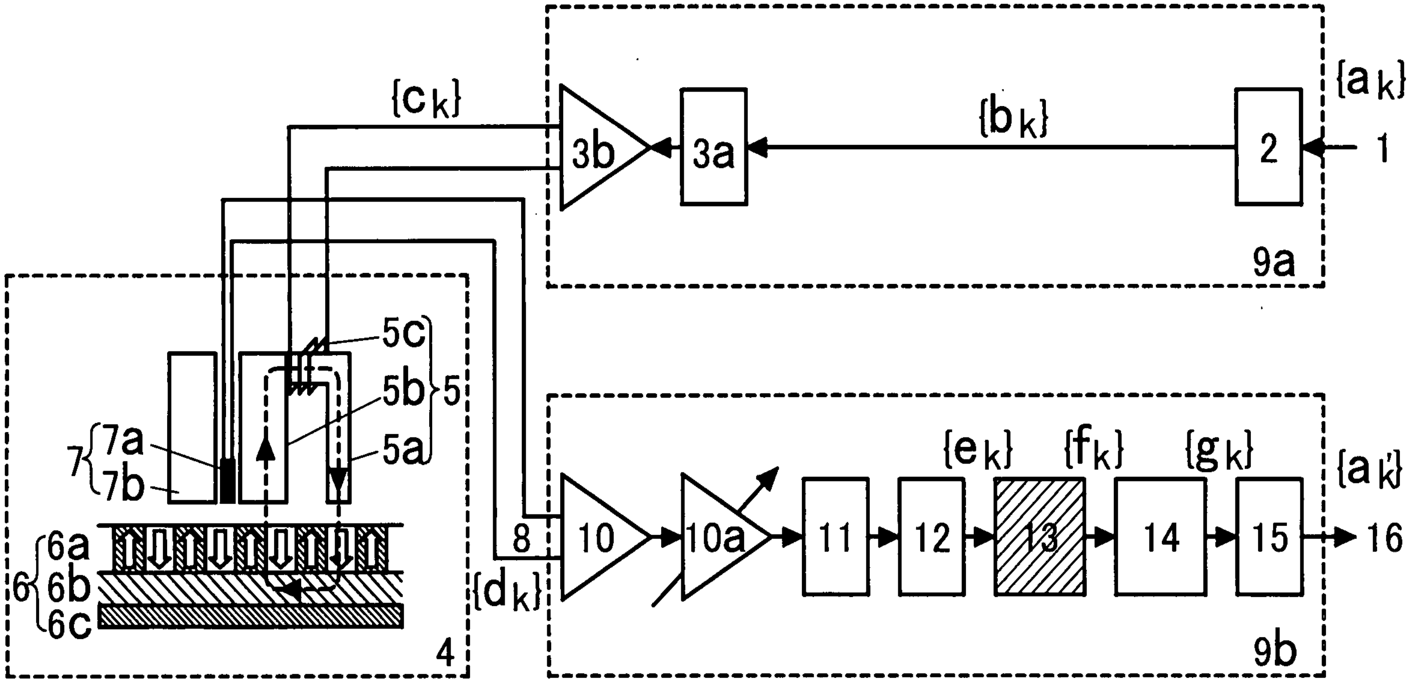
09940475 .102201

FIG. 1


{a_k}
1
2
{b_k}
3a
3b
9a
{c_k}
5c
5b
5
5a
7
7a
7b
6
6a
6b
6c
4
8
{d_k}
10
10a
11
12
{e_k}
13
{f_k}
14
{g_k}
15
{a_k'}
16
9b

E 6044

16

FIG. 2

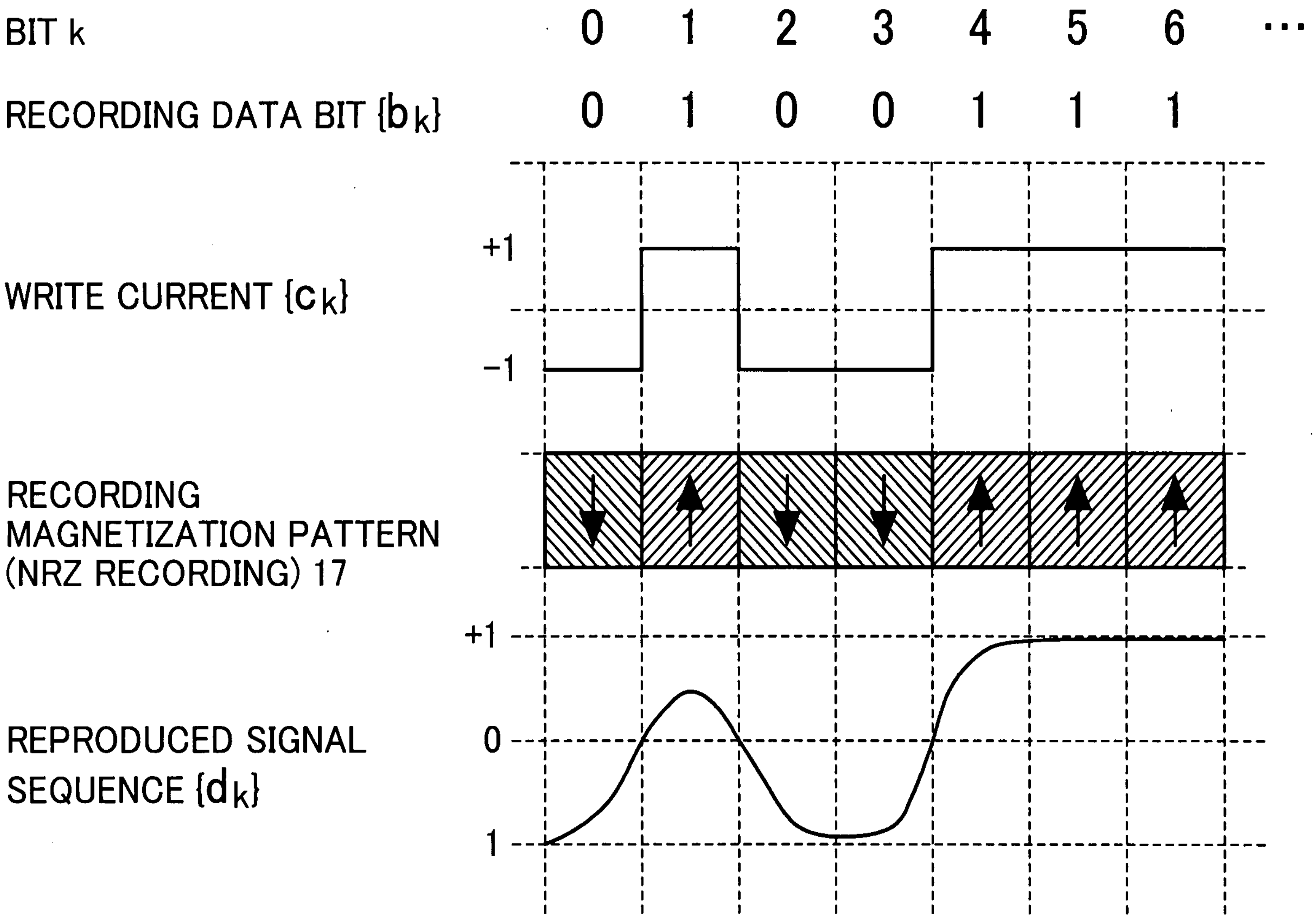
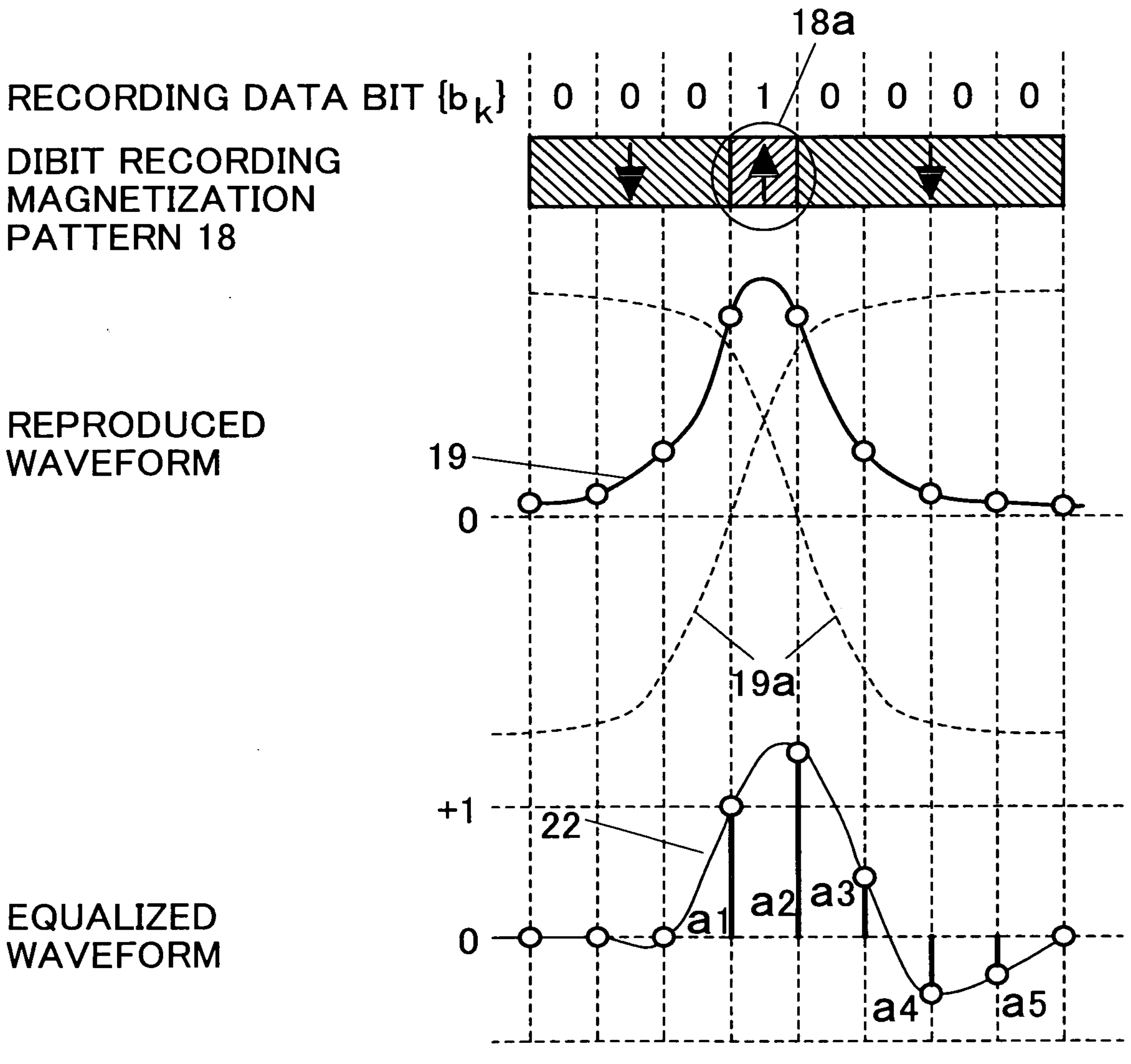

BIT k
0 1 2 3 4 5 6 ···
RECORDING DATA BIT {b_k}
0 1 0 0 1 1 1
WRITE CURRENT {c_k}
+1
−1
RECORDING MAGNETIZATION PATTERN (NRZ RECORDING) 17
REPRODUCED SIGNAL SEQUENCE {d_k}
+1
0
1

FIG. 3



18a
RECORDING DATA BIT {b_k}
0 0 0 1 0 0 0 0
DIBIT RECORDING MAGNETIZATION PATTERN 18
REPRODUCED WAVEFORM
19
0
19a
+1
22
EQUALIZED WAVEFORM
0
a1
a2
a3
a4
a5

09940475 .102201

FIG. 4

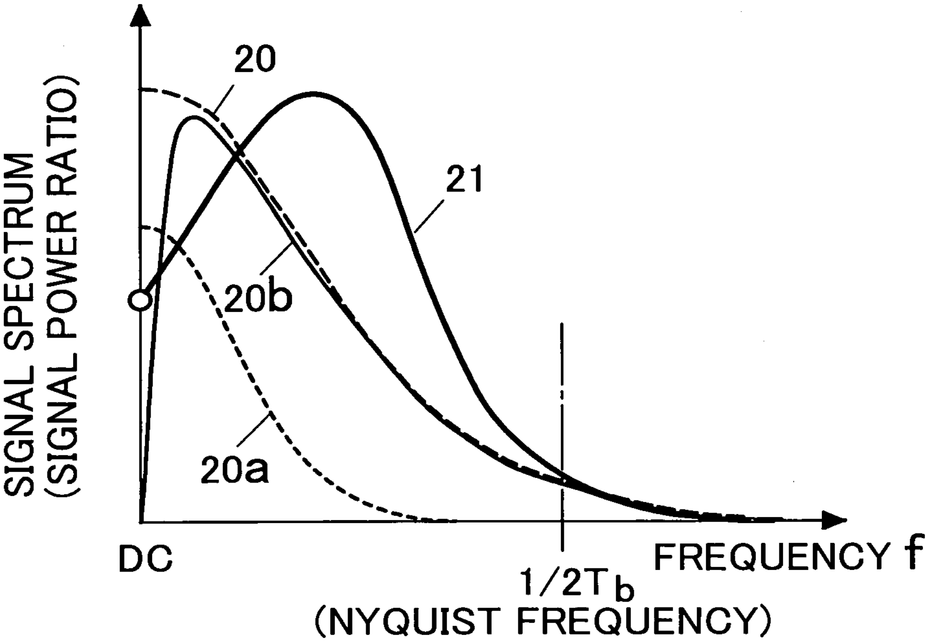

SIGNAL SPECTRUM
(SIGNAL POWER RATIO)
20
21
20b
20a
DC
1/2T_b
FREQUENCY f
(NYQUIST FREQUENCY)

FIG. 5

K=0.8

α	n=4 (a1,a2,a3,a4)	n=5 (a1,a2,a3,a4,a5)
0	(1.0 0.81 0.18 0.0)	(1.0 0.81 0.20 0.024 0.0)
0.1	(1.0 0.80 0.15 −0.024)	(1.0 0.81 0.20 0.019 −0.0048)
0.2	(1.0 0.78 0.11 −0.062)	(1.0 0.81 0.19 0.0063 −0.017)
0.3	(1.0 0.76 0.051 −0.11)	(1.0 0.81 0.18 −0.021 −0.039)
0.4	(1.0 0.72 −0.027 −0.17)	(1.0 0.79 0.15 −0.066 −0.074)
0.5	(1.0 0.67 −0.12 −0.23)	(1.0 0.77 0.099 −0.13 −0.12)
0.6	(1.0 0.60 −0.23 −0.29)	(1.0 0.74 0.027 −0.22 −0.17)
0.7	(1.0 0.53 −0.34 −0.36)	(1.0 0.69 −0.068 −0.31 −0.22)
0.8	(1.0 0.44 −0.47 −0.42)	(1.0 0.62 −0.18 −0.42 −0.28)
0.9	(1.0 0.35 −0.59−0.48)	(1.0 0.54 −0.31 −0.53 −0.32
1	(1.0 0.25 −0.72 −0.54)	(1.0 0.45 −0.46 −0.63 −0.36)

K=1.0

α	n=4 (a1,a2,a3,a4)	n=5 (a1,a2,a3,a4,a5)
0	(1.0 1.08 0.35 0.0)	(1.0 1.11 0.44 0.086 0.0)
0.1	(1.0 1.06 0.29 −0.041)	(1.0 1.11 0.43 0.069 −0.012)
0.2	(1.0 1.03 0.22 −0.093)	(1.0 1.11 0.41 0.037 −0.034)
0.3	(1.0 0.98 0.12 −0.15)	(1.0 1.10 0.38 −0.014 −0.068)
0.4	(1.0 0.92 0.016 −0.22)	(1.0 1.07 0.32 −0.087 −0.11)
0.5	(1.0 0.85 −0.10 −0.29)	(1.0 1.04 0.24 −0.18 −0.16)
0.6	(1.0 0.78 −0.23 −0.36)	(1.0 0.99 0.14 −0.29 −0.22)
0.7	(1.0 0.69 −0.37 −0.42)	(1.0 0.93 0.014 −0.41 −0.28)
0.8	(1.0 0.60 −0.51 −0.49)	(1.0 0.86 −0.13 −0.54 −0.33)
0.9	(1.0 0.51 −0.65 −0.56)	(1.0 0.77 −0.29 −0.67 −0.38)
1	(1.0 0.41 −0.79 −0.62)	(1.0 0.67 −0.45 −0.80 −0.43)

09940475.102201

FIG. 6

K=1.2

α	n=4 (a1,a2,a3,a4)	n=5 (a1,a2,a3,a4,a5)
0	(1.0 1.32 0.52 0.0)	(1.0 1.43 0.77 0.20 0.0)
0.1	(1.0 1.28 0.42 −0.056)	(1.0 1.42 0.75 0.15 −0.024)
0.2	(1.0 1.22 0.32 −0.12)	(1.0 1.40 0.70 0.090 −0.059)
0.3	(1.0 1.16 0.19 −0.19)	(1.0 1.38 0.63 0.0044 −0.10)
0.4	(1.0 1.08 0.059 −0.26)	(1.0 1.34 0.53 −0.10 −0.16)
0.5	(1.0 1.00 −0.082 −0.33)	(1.0 1.29 0.42 −0.23 −0.21)
0.6	(1.0 0.92 −0.23 −0.41)	(1.0 1.23 0.28 −0.37 −0.27)
0.7	(1.0 0.83 −0.38 −0.48)	(1.0 1.15 0.12 −0.51 −0.33)
0.8	(1.0 0.73 −0.53 −0.55)	(1.0 1.07 −0.052 −0.66 −0.39)
0.9	(1.0 0.63 −0.68 −0.63)	(1.0 0.98 −0.23 −0.82 −0.45
1	(1.0 0.53 −0.84 −0.70)	(1.0 0.88 −0.42 −0.96 −0.50)

K=1.4

α	n=4 (a1,a2,a3,a4)	n=5 (a1,a2,a3,a4,a5)
0	(1.0 1.50 0.65 0.0)	(1.0 1.72 1.15 0.33 0.0)
0.1	(1.0 1.44 0.52 −0.068)	(1.0 1.70 1.08 0.25 −0.038)
0.2	(1.0 1.37 0.39 −0.14)	(1.0 1.66 0.99 0.15 −0.085)
0.3	(1.0 1.29 0.24 −0.22)	(1.0 1.62 0.88 0.027 −0.14)
0.4	(1.0 1.20 0.092 −0.29)	(1.0 1.57 0.74 −0.11 −0.20)
0.5	(1.0 1.11 −0.065 −0.37)	(1.0 1.50 0.59 −0.27 −0.26)
0.6	(1.0 1.02 −0.22 −0.45)	(1.0 1.43 0.41 −0.43 −0.33)
0.7	(1.0 0.93 −0.38 −0.53)	(1.0 1.35 0.23 −0.60 −0.39)
0.8	(1.0 0.83 −0.55 −0.60)	(1.0 1.26 0.032 −0.78 −0.45)
0.9	(1.0 0.73 −0.71 −0.68)	(1.0 1.16 −0.17 −0.95 −0.51)
1	(1.0 0.63 −0.87 −0.76)	(1.0 1.06 −0.37 −1.12 −0.57)

09640475.102201

FIG. 7

K=1.6

α	n=4 (a1,a2,a3,a4)	n=5 (a1,a2,a3,a4,a5)
0	(1.0 1.63 0.74 0.0)	(1.0 1.97 1.50 0.47 0.0)
0.1	(1.0 1.55 0.59 −0.076)	(1.0 1.93 1.40 0.35 −0.051)
0.2	(1.0 1.47 0.44 −0.15)	(1.0 1.88 1.25 0.21 −0.108)
0.3	(1.0 1.38 0.28 −0.23)	(1.0 1.82 1.10 0.047 −0.17)
0.4	(1.0 1.29 0.12 −0.32)	(1.0 1.75 0.92 −0.12 −0.24)
0.5	(1.0 1.20 −0.051 −0.40)	(1.0 1.68 0.74 −0.30 −0.30)
0.6	(1.0 1.10 −0.22 −0.48)	(1.0 1.59 0.53 −0.49 −0.37)
0.7	(1.0 1.00 −0.39 −0.56)	(1.0 1.50 0.33 −0.68 −0.44)
0.8	(1.0 0.90 −0.56 −0.64)	(1.0 1.41 0.11 −0.87 −0.51)
0.9	(1.0 0.80 −0.73 −0.72)	(1.0 1.31 −0.11 −1.06 −0.57
1	(1.0 0.70 −0.90 −0.80)	(1.0 1.21 −0.33 −1.25 −0.64)

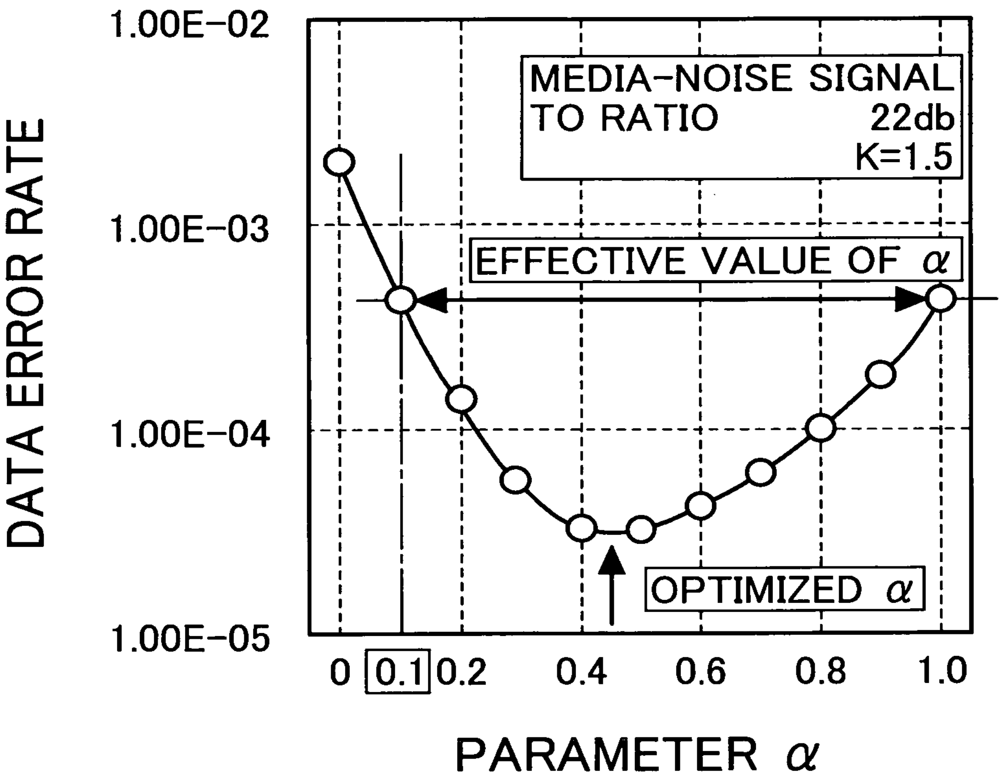
K=1.8

α	n=4 (a1,a2,a3,a4)	n=5 (a1,a2,a3,a4,a5)
0	(1.0 1.71 0.80 0.0)	(1.0 1.97 1.50 0.47 0.0)
0.1	(1.0 1.62 0.64 −0.081)	(1.0 1.93 1.40 0.35 −0.051)
0.2	(1.0 1.53 0.47 −0.16)	(1.0 1.88 1.25 0.21 −0.108)
0.3	(1.0 1.44 0.30 −0.25)	(1.0 1.82 1.10 0.047 −0.17)
0.4	(1.0 1.35 0.13 −0.33)	(1.0 1.75 0.92 −0.12 −0.24)
0.5	(1.0 1.25 −0.041 −0.42)	(1.0 1.68 0.74 −0.30 −0.30)
0.6	(1.0 1.15 −0.22 −0.50)	(1.0 1.59 0.53 −0.49 −0.37)
0.7	(1.0 1.05 −0.39 −0.59)	(1.0 1.50 0.33 −0.68 −0.44)
0.8	(1.0 0.96 −0.57 −0.67)	(1.0 1.41 0.11 −0.87 −0.51)
0.9	(1.0 0.86 −0.74 −0.75)	(1.0 1.31 −0.11 −1.06 −0.57)
1	(1.0 0.76 −0.92 −0.84)	(1.0 1.21 −0.33 −1.25 −0.64)

VALUES OF PARTIAL RESPONSE INTERSYMBOL INTERFERENCE SET IN THE ONE OF EMBODIMENTS OF THE INVENTION (K=1.6,1.8)

09940475.102201

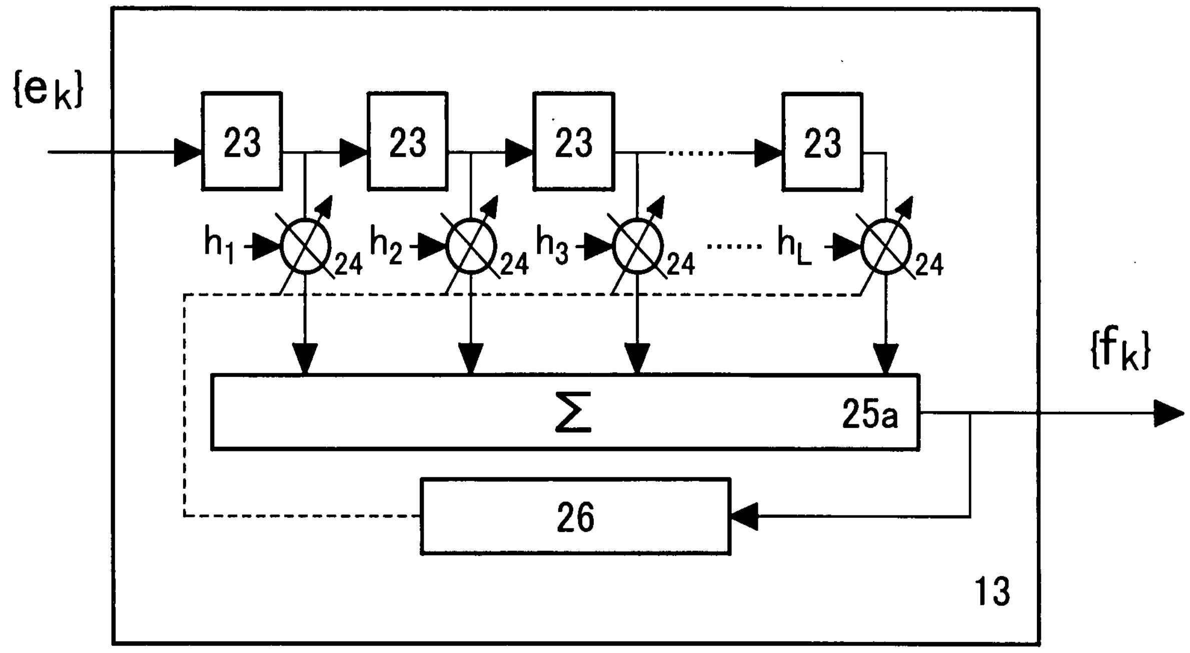
FIG. 8



09940475.102201

09940475.102201

FIG. 9


{e_k}
23
23
23
23
h_1
h_2
h_3
h_L
24
24
24
24
Σ
25a
26
13
{f_k}

T0220T"S2h0h660

FIG. 10

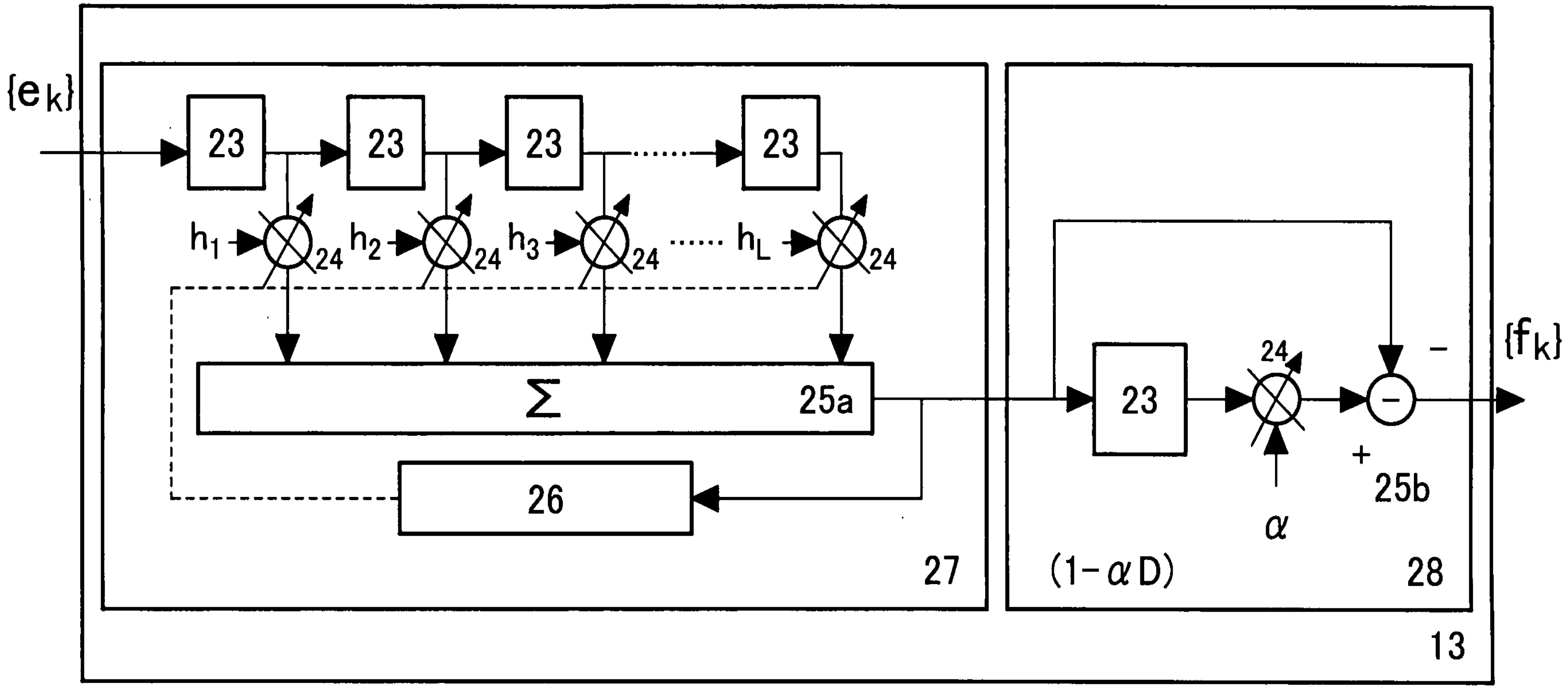
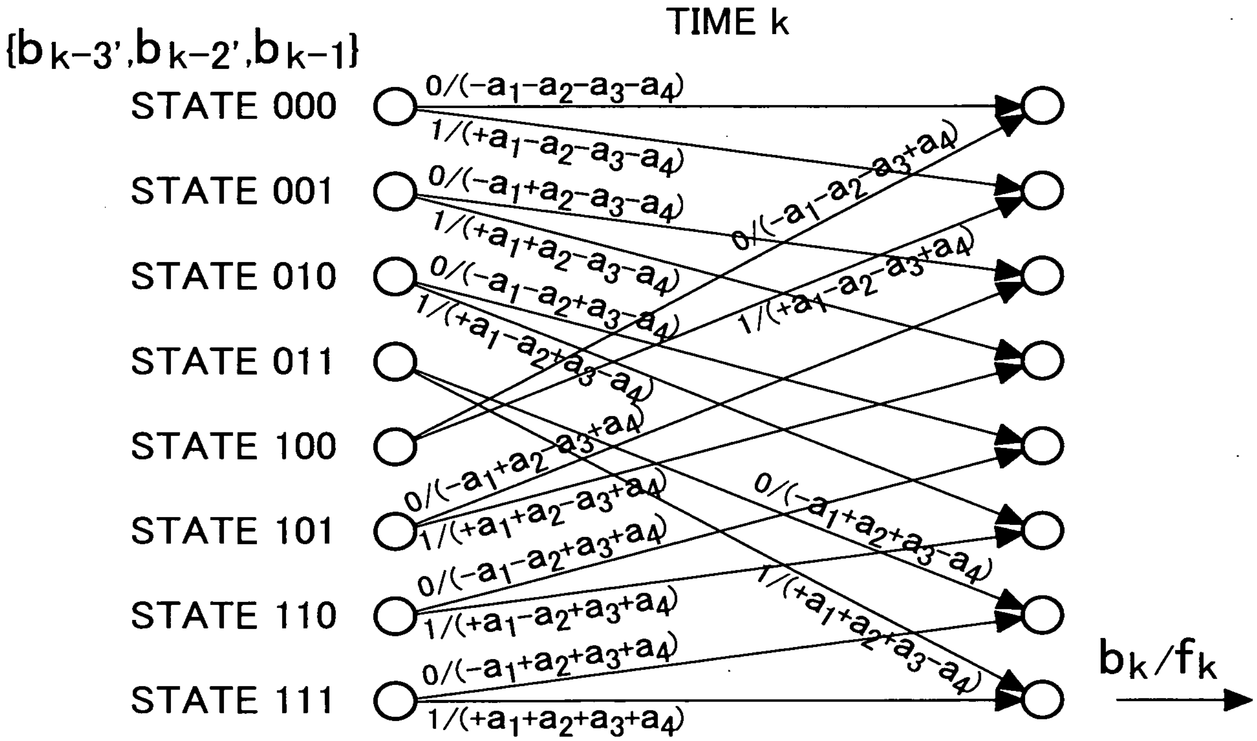

{e_k}
23
23
23
23
h1
h2
h3
hL
24
24
24
24
Σ
25a
26
27
23
24
α
−
+
25b
(1−αD)
28
{f_k}
13

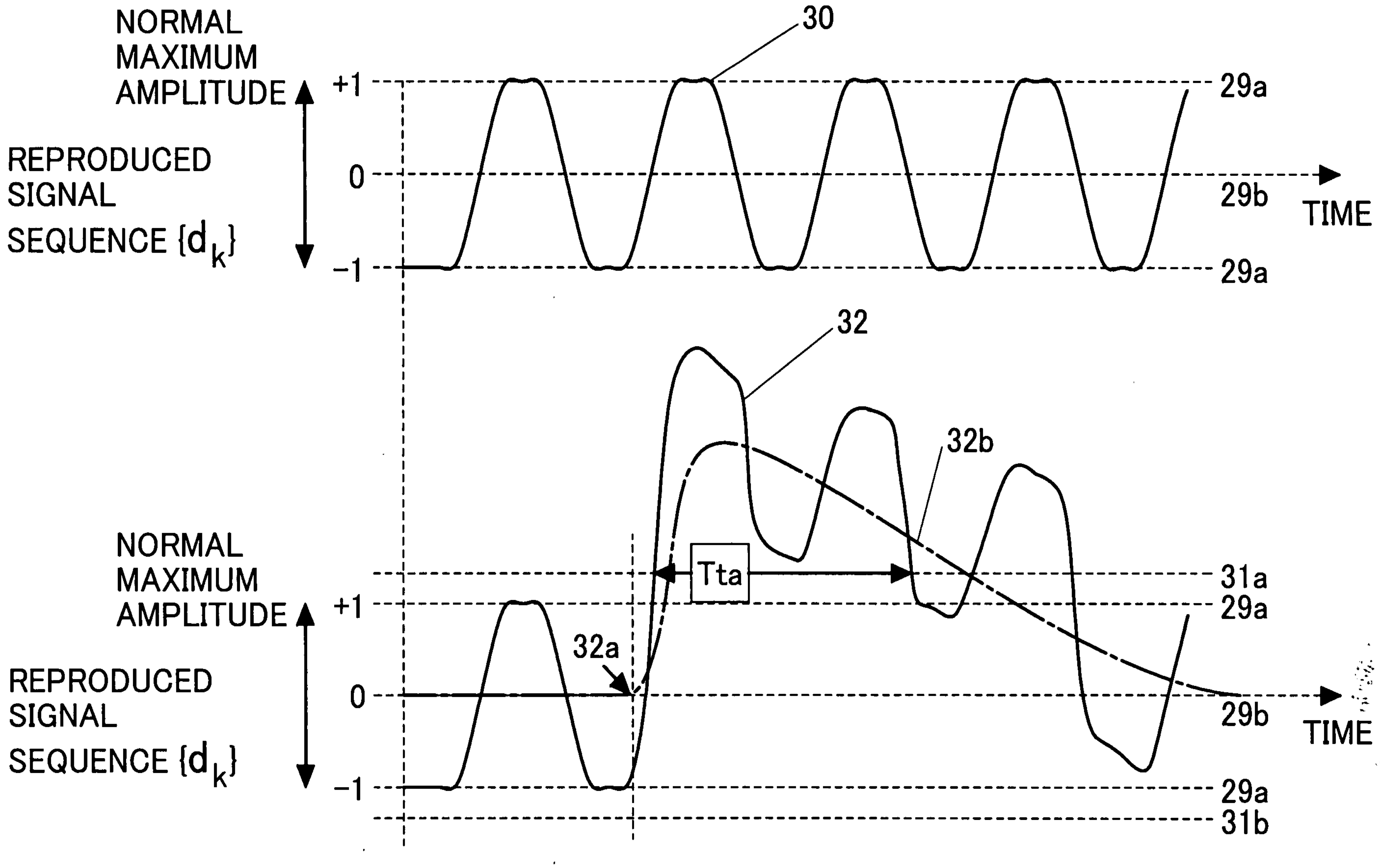
FIG. 11


TIME k
{bk-3',bk-2',bk-1}
STATE 000
STATE 001
STATE 010
STATE 011
STATE 100
STATE 101
STATE 110
STATE 111
0/(-a1-a2-a3-a4)
1/(+a1-a2-a3-a4)
0/(-a1+a2-a3-a4)
1/(+a1+a2-a3-a4)
0/(-a1-a2+a3-a4)
1/(+a1-a2+a3-a4)
0/(-a1-a2-a3+a4)
1/(+a1-a2-a3+a4)
0/(-a1+a2-a3+a4)
1/(+a1+a2-a3+a4)
0/(-a1+a2+a3-a4)
1/(+a1+a2+a3-a4)
0/(-a1-a2+a3+a4)
1/(+a1-a2+a3+a4)
0/(-a1+a2+a3+a4)
1/(+a1+a2+a3+a4)
bk/fk

09940475 .102201

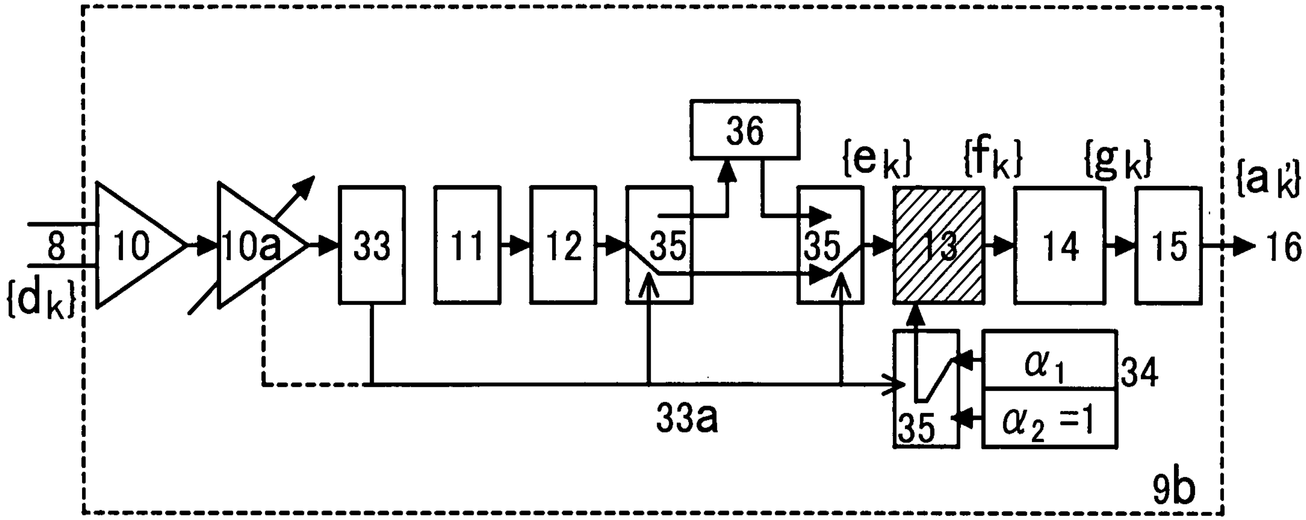
09940425.102201

FIG. 12



09940475.102201

FIG. 13


8
{dk}
10
10a
33
11
12
35
36
35
{ek}
13
{fk}
14
{gk}
15
{ak'}
16
33a
35
α1
α2 =1
34
9b

09940475 .102201

FIG. 14

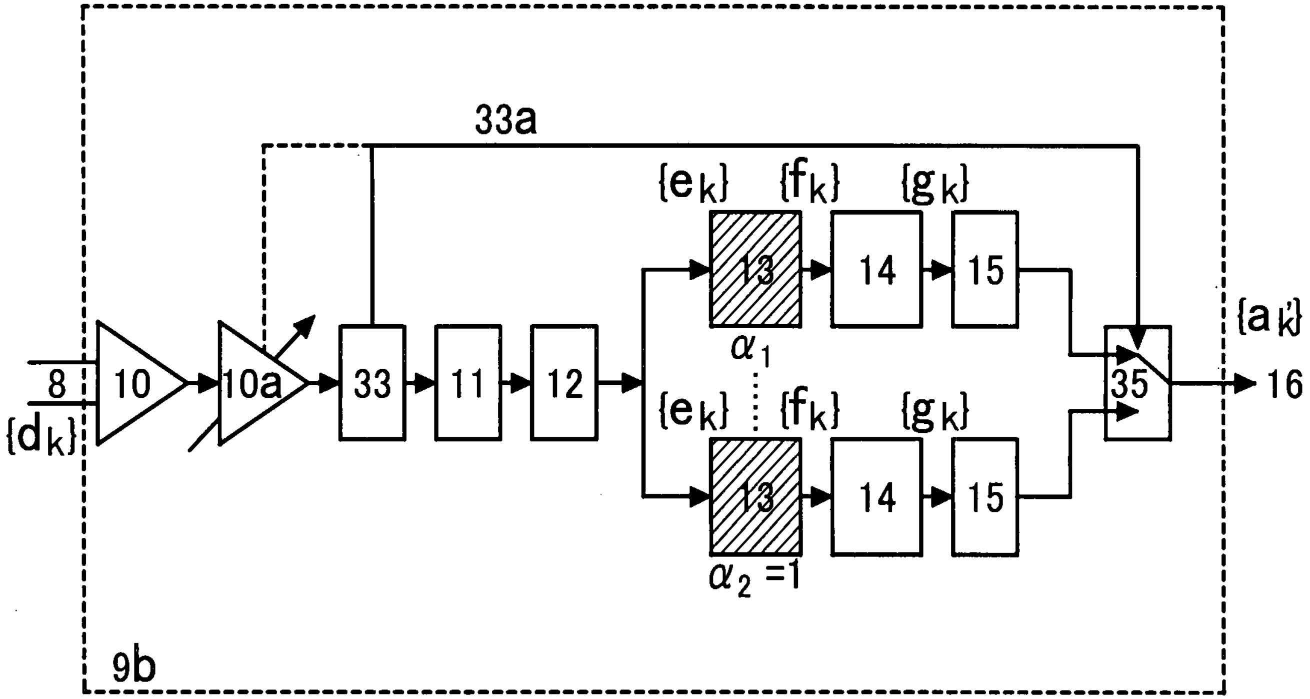

33a
$\{e_k\}$
$\{f_k\}$
$\{g_k\}$
13
14
15
α_1
$\{a_k'\}$
8
$\{d_k\}$
10
10a
33
11
12
35
16
$\{e_k\}$
$\{f_k\}$
$\{g_k\}$
13
14
15
$\alpha_2 = 1$
9b

FIG. 15

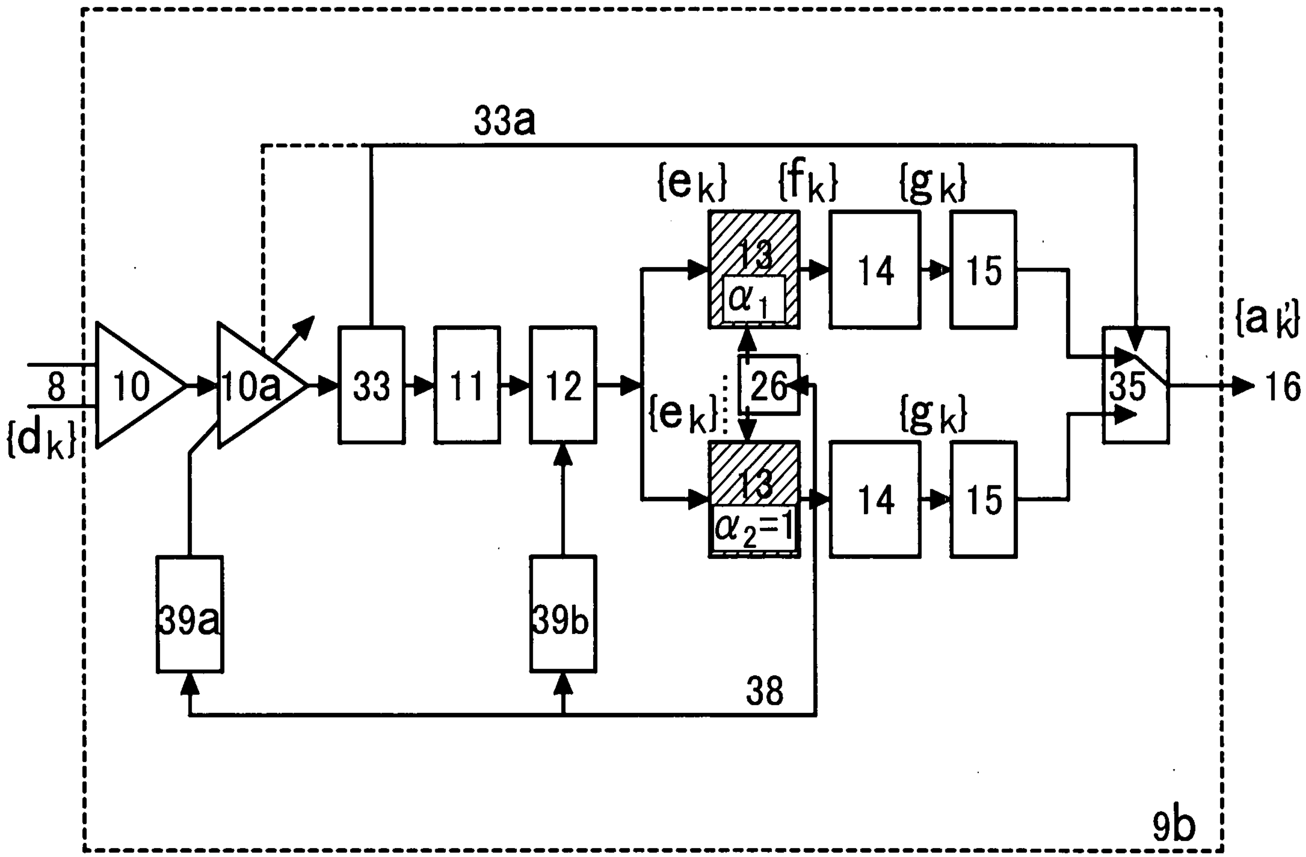
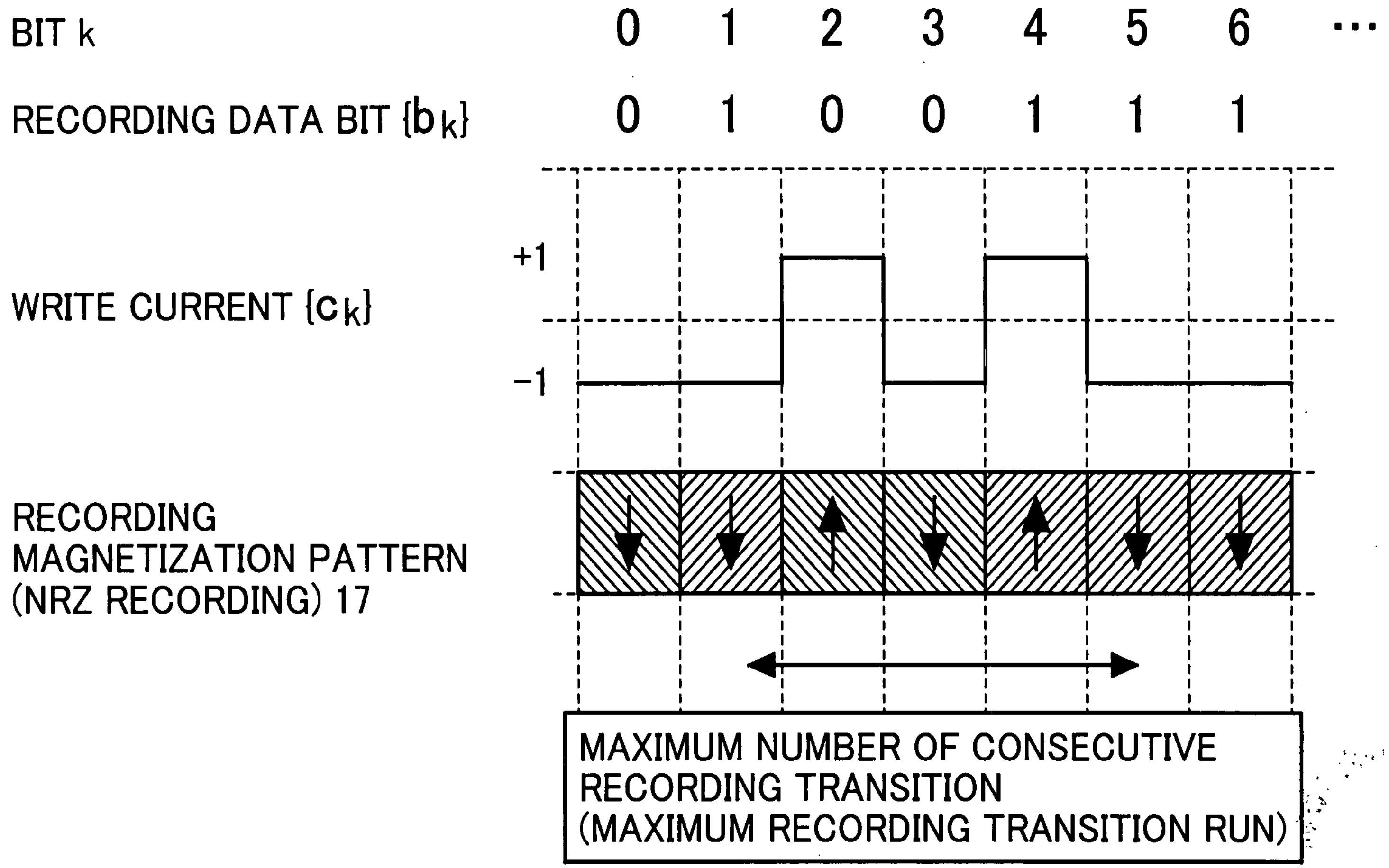

{d_k}
{e_k}
{f_k}
{g_k}
α_1
{e_k}
α_2=1
{g_k}
{a_k'}
9b

FIG. 16


BIT k
…
RECORDING DATA BIT {b_k}
WRITE CURRENT {c_k}
+1
−1
RECORDING MAGNETIZATION PATTERN (NRZ RECORDING) 17
MAXIMUM NUMBER OF CONSECUTIVE RECORDING TRANSITION (MAXIMUM RECORDING TRANSITION RUN)